AIR WAR COLLEGE

AIR UNIVERSITY

# IN PURSUIT OF 21ST CENTURY DISTRIBUTED INTELLIGENCE SURVEILLANCE AND RECONNAISSANCE OPERATIONS

by

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## Contents

# Illustrations

*Page*

## Biography

Lt Col Michael L. Downs is a student at the Air War College. Prior to this assignment, he was the Commander of the 303rd Intelligence Squadron, Osan Air Base, Republic of Korea. The 303rd Intelligence Squadron conducts surveillance and reconnaissance for U.S. Forces Korea and 7th Air Force in the defense of the Republic of Korea.

He is a career intelligence officer with a broad background holding assignments at the unit, AOC, MAJCOM, Air Staff and OSD levels. He has participated in 18 joint and combined operations and exercises in CENTCOM, EUCOM, PACOM, and SOUTHCOM AORs and has served in an array of capacities ranging from a Joint Special Operations Task Force J2 in the Balkans to the chief developer of the Joint Integrated Prioritized Target List during Operation IRAQI FREEDOM. Lt Col Downs also served as the director of operations, 13$^{th}$ Intelligence Squadron, Beale AFB, CA where he directed his squadron's daily Global Hawk, Predator, and U-2 exploitation missions in support of operations in the PACOM AOR as well as Operations IRAQI FREEDOM, ENDURING FREEDOM, and JTF Horn of Africa.

Lt Col Downs received his Bachelor's degree from Texas A&M where he was an ROTC Distinguished Graduate earning his commission as a Second Lieutenant in Dec, 1992. He has earned a Master of Organizational Management from George Washington University, a Master of Public Administration from Troy State University, and a Master of National Security and Strategic Studies from the Naval Command and Staff College. He is a graduate of the Intelligence Officer Course, Squadron Officers School (Distinguished Graduate), Air Force Combat Targeting Course (Honor Graduate), Air Operations Center Course (Distinguished Graduate), Air Command and Staff College (non-resident program), Naval Command and Staff College (Distinguished Graduate), and Air War College (non-resident program).

His personal awards and decorations include the Bronze Star Medal, Meritorious Service Medal (three oak leaf clusters), Air Force Commendation Medal (two oak leaf clusters), Joint Service Achievement Medal, Air Force Intelligence Officer of the Year Award, and the Outstanding Young Man of America Award.

# Introduction

The attached visual illustrates the impressive nature of America's 21st Century globally networked Joint Force.  From bases in the United States, Airmen fly MQ-1 Predator, MQ-9 Reaper and RQ-4 Global Hawk Remotely Piloted Aircraft (RPA) over hostile battlefields in distant lands.  The platforms collect vast quantities of information that are streamed back to Distributed Common Ground System (DCGS) intelligence centers located around the world.  DCGS Airmen identify threats and relay vital information back to supported units on the battlefield.  Viewers often reasonably conclude that this array of sensors, aircraft, communications links and intelligence centers seamlessly operate as a collective team, perhaps akin to a crew on an E-3 Airborne Warning and Control System (AWACS) or E-8C Joint Surveillance Attack Radar System (JSTARS).  Unfortunately, this is not the case.

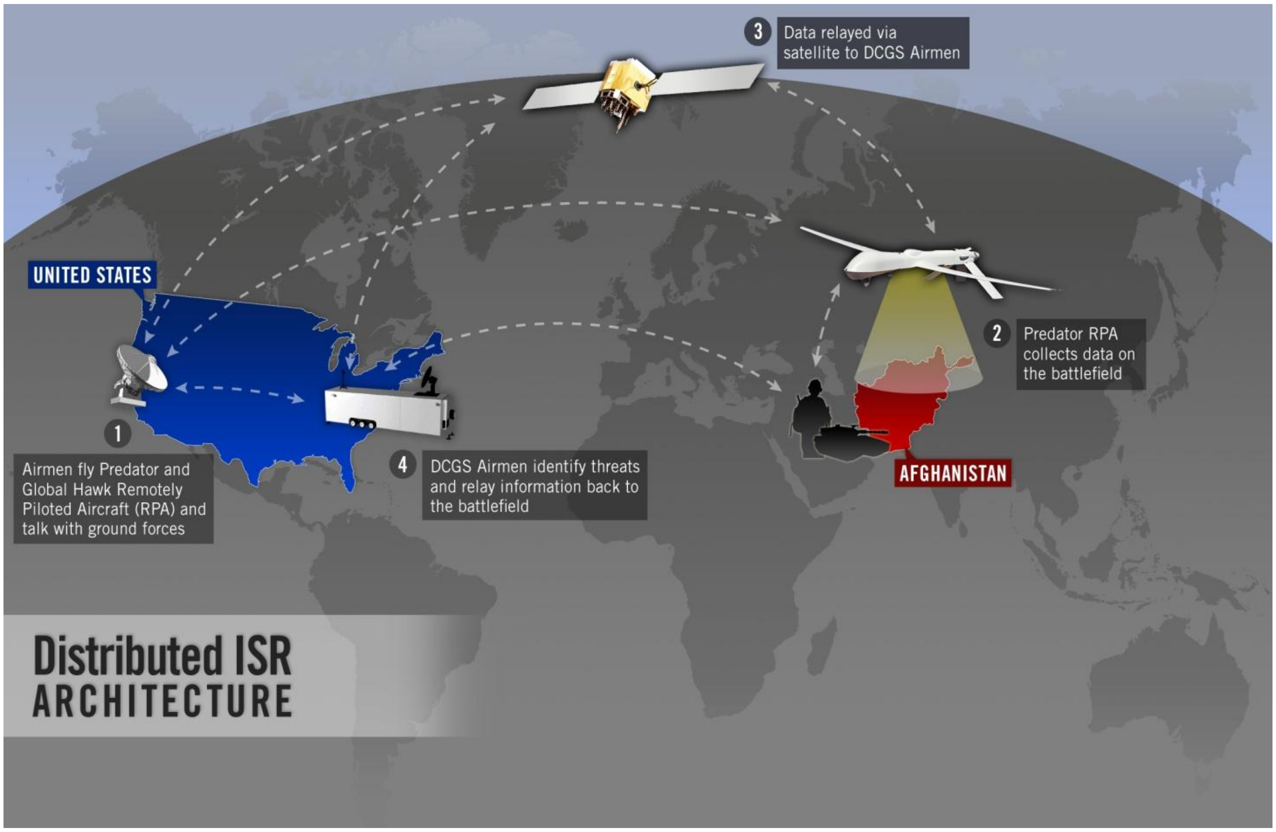


***Figure 1. Air Force Distributed ISR Architecture***

What is seldom understood is that the RPA front and DCGS back-end components of this technological marvel do not operate as an integrated crew. Its members do not plan, debrief or discuss the mission together. In fact, the members rarely know one another. Moreover, the Predator pilot does not yet have two-way voice communications with the back-end DCGS intelligence crew. Yet senior Air Force leaders expect, and in some cases believe, the front and back-end elements successfully connect in cyberspace, function as a virtual team, and together expertly conduct their mission. The American military made similar assumptions in 1979 and the results were disastrous.

In 1979, President Carter authorized a daring attempt to rescue American hostages held in the American Embassy in Tehran, Iran. Operation EAGLE CLAW ended tragically on a highway strip south of Tehran. The multi-service elements of the team trained separately and were married up with one another for the first time during the operation. Disparities in communication, chain of command, training, equipment and other issues overwhelmed the team introducing the Clausewitzian elements of fog and friction and causing the mission to spectacularly fail. As a result, Congress created United States Special Operations Command (USSOCOM), a command structure designed to promote unity of effort amongst the Special Operations community.[1]

Similar to the Special Operations Forces (SOF) in EAGLE CLAW, the operational effectiveness of Air Force Intelligence, Surveillance and Reconnaissance (ISR) RPA and DCGS elements is limited because they operate independently rather than as an integrated team. ***Though a cyber network links these nodes, a framework to optimize their employment does not exist.*** Framework limitations include:

1) comprehensive Air Force-level direction to integrate operations

2) a lack of mechanisms to build a virtual crew between the elements

3) a dearth of operational doctrine and procedures

4) the absence of inter-nodal training.

This paper will briefly examine the current RPA-DCGS interaction, analyze the historic causes of this front-end / back-end bifurcation challenge, expound on current shortfalls and progress, and provide recommendations to resolve them and improve overall AF distributed ISR effectiveness.

## Operational Context

The requirements for ISR support have exploded over the last 15 years. During the 1990s-era Balkan campaigns, the AF typically manned one RQ-1 Predator combat air patrol

(CAP) a day.[2] In the last 6 years, the demand has skyrocketed and AF RPA CAPs have grown from 4 CAPs per day in 2004 to an expected 65 by 2013.[3] Moreover, the Predator has been joined by an armada of RPAs including AF MQ-9 Reaper and RQ-4 Global Hawk and a myriad of lower altitude models fielded by sister services. Unlike their sister-service counterparts, today's MQ-1 and MQ-9 are multi-role aircraft that conduct ISR as well as air-to-ground kinetic operations, adding a layer of complexity to RPA-DCGS interaction. Nevertheless, 97% of MQ-1/9 operational time in the CENTCOM AOR is spent in an ISR role.[4]

As described earlier, the AF distributed ISR employment concept consists of RPA front-ends teamed with DCGS analytic back-ends. RPA and DCGS units have a symbiotic relationship. Though regarded officially as distinct weapon systems, for mission execution they should be thought of as a single platform combining their capabilities on nearly every mission. For example, an RPA's ISR contribution would be minimal if it did not have DCGS intelligence professionals analyzing the information its sensors collected. These DCGS crews receive the multi-discipline information collected from the RPAs, analyze it, convert the information into useable and actionable intelligence and products, and disseminate them to supported units around the world. Conversely, a DCGS would have nothing to analyze if RPA crews did not integrate their platforms into battlespace operations and provide DCGS crews useful information to evaluate. RPA crews fly the airplanes, handle voice communications with supported ground units, steer the imagery sensor, and in the case of MQ-1 and MQ-9s, employ weapons when needed.

The missions of both of these nodes are inextricably linked. They both exist to produce lethal effects in the battlespace and also provide optimized intelligence to decision makers located at the lowest echelon tactical units and the highest political levels. To date, RPA and

DCGS crews have produced countless ISR successes in Afghanistan and Iraq ranging from the high profile killing of the leader of Al Qaeda in Iraq (AQI), Abu Musab al Zarqawi in 2006 to the 24/7 support they provide fielded forces in Afghanistan and Iraq today.[5] Despite the tremendous rise in demand for ISR, the shared nature of DCGS and RPA missions, and the numerous operational successes AF distributed ISR assets have produced, ISR failures still occur due to front-end, back-end limitations.

On 21 February 2010, an MQ-1 crew working with a DCGS crew while supporting a ground operation in Uruzgan District, Afghanistan, "fed reports to an Army unit on the ground that ordered" an attack by Army helicopters on a convoy.[6] As a result, 23 innocent civilians were killed. Brigadier General Robert Otto, the investigating officer noted that prior to the strike, the DCGS identified "children" in the convoy but the MQ-1 crew downgraded the call to "possible children."[7] Later, the DCGS crew identified two "*adolescents*."[8] General Otto found "with no common *adolescent* definition" and "the use of imprecise non-standard terms" the MQ-1 crew "erroneously assumed they and the DCGS were in agreement as they transformed *adolescents* to *teenagers.*"[9] Ground force elements "took *teenagers* to be *military aged males*" and the MQ-1 crew agreed with that assessment.[10] The general concluded "If the D[C]GS had the ability to monitor" the MQ-1's "radio calls [to the ground force], they would have been aware that *adolescents* became *teenagers* and *teenagers* became *military aged males* and may have prevented the incident."[11]

This tragic civilian casualty incident was caused by the lack of integration between the DCGS and RPA units. The investigation identified shortfalls in leadership, codified roles and responsibilities, communications equipment and integrated RPA and DCGS training.[12] The incident also exposed the dangers that arise from a lack of habitual relationships and their corresponding impact on trust between the front and back-end nodes.

While the investigation into the Uruzgan incident resulted in positive changes, it would be a mistake for AF leaders to conclude this progress or frequent operational successes indicate the integration challenge has been resolved. When Jack Welch became Chief Executive Officer of a very successful GE Corporation in 1981, he faced a similar scenario, an organization that produced strong results despite significant partitions between the company's divisions. Welch famously stated "I took a company that everybody thought was perfect and had a fight with it."[13] Yet by rethinking how GE conducted its core business functions, focusing efforts on eliminating boundaries between GE's divisions, and building a teamwork approach to all operations, he transformed the company.[14] When he retired in 2001, GE's market capitalization had increased from $13B to $490B including a minimum of 12% growth each year.[15]

## Front-End, Back-End Limitations

To appreciate the full lack of integration between RPA and DCGS units, it is necessary to understand the fielding and employment of these weapon systems. To be fair, teaming relationships do occur between RPA and DCGS crews on an *ad hoc* though infrequent basis. Additionally, the lack of integration is not the fault of crews on either end as they are great Airmen dedicated to their mission and working within designed mission constraints. However, the root cause of the lack of integration is the Air Force's traditional view of weapon systems that treats front and back-ends as distinct and separate components. Thus it fails to comprehend the scope of what is necessary for successful operations. The AF assumes that by providing a robust communications network to link RPA and DCGS elements, they can operate seamlessly and their crews can link together in cyberspace and function as a larger virtual crew. Based on this flawed assumption, corporate AF has not recognized the lack of teaming; thus it has made little effort to treat the operational elements as a single crew. As a leading action officer assigned to Headquarters Air Force (HAF)/A2 ISR Collections Capabilities Division noted in 2011, "*we threw all of this together to meet the pressing needs of the war. But somehow, we have to mold the distributed ISR system to where it should be. The key is that we don't just mold it to meet the needs of the current wars in Iraq and Afghanistan but keep an eye on future operating concepts as well*."[16]

A review of the characteristics of other large crew aircraft-based weapon systems, such as AWACS, JSTARS or RIVET JOINT, provide a model to consider how to better integrate RPA and DCGS operations. These include:

A) Mode of Operation

B) Crew Communication Mechanisms

C) Weapon Systems Ownership

D) Operational Documentation

E) Integrated Crew Training.

**Mode of Operations - Shortfalls:**

**Nodes Operate as Separate Crews:** In a JSTARS, the pilots and navigators are not regarded as a separate crew from the back-end air battle managers and intelligence specialists. They function as a single crew and accomplishing the mission is their combined responsibility.[17] While there are front-end and back-end leaders, this crew model demonstrates the value of Unity of Command as it designates a Pilot in Command "responsible for the safe accomplishment of the flight."[18] Additionally, there is an Air Force Crew Resource Management (CRM) Instruction that governs a crew's interactions and seeks to maximize the operational effectiveness and combat capability of all crew members.[19] This Air Force Instruction promotes strong crew communication, mission planning and debriefing, crew coordination and integrity, task management and the promulgation of situational awareness across the crew.[20]

These crew characteristics resemble the traits of high performance teams (HPTs) - commonly understood goals, clearly defined member roles, and high degrees of interdependence where "team members work together as a unit."[21] Generally, HPTs have strong, adaptive leadership and open communication and feedback. "Members of high performance teams spend time planning how they will solve problems and make decisions."[22] The AF understands that effective operations require effective crews so they must function as HPTs. The AF, like other military services, recognizes that high performing crews often have a cohesive bond which is born out of intense training, shared hardships, military tradition, daily squadron life and informal off-duty interactions.

Yet DCGS and RPA crews do not share many attributes of HPTs or tight-knit crews. On a typical mission, an RPA pilot does not know who his DCGS "crewmates" are and is not responsible for overall crew resource management. The pilot is not designated the mission commander of the RPA/DCGS team nor does he have responsibility for overall mission accomplishment. The pilot's sole concern is for the RPA mission; the products produced from the information gathered is incidental – herein lies a significant challenge.

**Duplication of Effort:** Due to the lack of integration, there is also a potential duplication of effort between like crew positions in the front and back-end elements. For example the MQ-1/9 Mission Intelligence Coordinator and DCGS Multi-Source Analyst positions both conduct all-source intelligence analysis functions.[23] While each is necessary for their distinct weapon systems, the potential exists for either of them to serve the entire virtual crew. A change to the Concept of Operations (CONOPs) is required for real collaboration to happen.

**Lack of Integrated Mission Planning:** In other weapon systems, front and back-end airborne crews mission plan and pre-brief together building a shared understanding of mission objectives. Conversely, RPA and DCGS units rarely mission plan together. They separately coordinate with jointly supported front-line units. Because of this unnatural division, they often fail to share with each other vital pre-mission information. For example the DCGS uses the DCGS Analysis and Reporting Team to coordinate with supported units, gather intelligence on the adversary, and prepare DCGS crews for upcoming missions.[24] This highly relevant data could be extremely beneficial to RQ-4 or MQ-9 crews. Similarly, Predator elements from the Wing Operations Center at Creech AFB are in contact with the combat units they support often receiving operations order type information that could provide DCGS crews tremendous situational awareness. Under the current operational construct, valuable contextual information goes unshared.

Detailed integrated planning is a key characteristic of effective crews and HPTs. Today, the RPA and DCGS elements do not develop a common understanding of mission priorities; do not function or communicate as a crew; and are not as operationally effective as they should be.

**Lack of Integrated Debriefs:** The current process does not provide for combined debriefs while HPTs are known to "give each other constructive feedback about individual performance" and use "feedback about team processes and productivity to make improvements in how it" functions.[25] While RPA and DCGS units conduct individual briefings, a good continuous improvement process requires that team members analyze the mission and draw conclusions together.  Not only does this result in a unity of perspective critical for developing shared objectives and purpose, but it builds relationships and trust among team members.

**Mode of Operations - Progress:**

Despite the lack of operational integration, the investigation into the Uruzgan incident spurred Air Combat Command (ACC) to initiate a program to bridge this divide.  Though limited in scale, this initiative represents a solid step in integrating the front and back-end elements.  A new Cross Functional Operations Center (CFOC) at Beale AFB will enable the Global Hawk and DCGS units located there to conduct portions of their operations in a shared facility.[26]  In December 2010, these units conducted an Air Force Smart Operations (AFSO) 21 analysis to determine if mission planning duplication could be eliminated by joint planning.[27]  The study was insightful and demonstrated the great value of a fully integrated planning process.  Based on this success, ACC is evaluating the feasibility of relocating RQ-4 Mission Control Elements to the DCGS facility that places RQ-4 and DCGS execution segments in the same facility.[28] Though other DCGS units will not benefit directly from co-location, this joint planning effort is a model for front and back-end integrated mission planning.  Co-location provides an important decision consideration for senior leaders determining where to base future RPA and DCGS units.[29]

**Crew Communication Mechanisms - Shortfalls:**

**Voice Communications:**  Crew communication during a mission is another key to successful operations.  In comparing distributed ISR and large crew airborne ISR platforms, crewmembers throughout the AWACS aircraft communicate with one another by voice unlike their isolated RPA/DCGS counterparts.  While plans exist to install two-way voice communication equipment between much of the front and back-end distributed ISR architecture, the overall scope of the project and a completion date have not been determined.[30] This tremendous deficiency, still present nearly 20 years after the first Predators began operating in the Balkans, underscores the Air Force's failure to properly envision and organize distributed ISR operations.[31]

**Chat Communications:** To date, the two nodes communicate via chat, which lacks the context provided by emotive elements that are conveyed through verbal communications. It makes it difficult for a receiver to divine the sender's intent and the sender cannot easily detect uncertainty from the receiver. As a former commander of a Marine RPA Battalion in Afghanistan from 2009 to 2010 stated "*you do get data in MIRC chat but not necessarily context. Instead, you might get three disparate events*" communicated in a chat room.[32] While it fails to provide detailed context, chat does have its place in distributed operations since it allows quick coordination between ISR units, C2 nodes and supported units in the battlespace.

**Team Building Media:** The lack of communications between the RPA and DCGS makes it difficult to build the relationships and knowledge base required for HPTs. The challenge a vastly dispersed architecture presents can be mitigated by using modern communication tools to build cohesion between members. In the words of a former commander of the 13th Intelligence Squadron (IS), a DCGS unit at Beale AFB, "*textual communication has to be personalized*."[33] Though business is often successfully conducted in chat rooms, this impersonal medium prevents crew members on either end from knowing or seeing one another. Crew members do not feel part of a team and thus do not build trusting relationships. The former 13 IS commander argues that in the age of social media, where a good portion of the Airmen operating these weapon systems are accustomed to communicating and building relationships in more robust social media forums such as Facebook, the Air Force stands to gain much by providing similar classified social media sites to facilitate virtual team building.[34]

**Crew Communication Mechanisms - Progress:**

Another advancement initiated in the wake of the Uruzgan incident investigation is ACC's four-phase measured approach to install voice communication links between MQ-1/9 and DCGS units. The plan is a proof-of-concept and if successful, training and force-wide fielding will follow.[35] This measured start will improve coordination and will eventually be extended to RQ-4 units as well. Still, this advancement is complicated by the multi-MAJCOM nature of this initiative.

**Weapon System Ownership - Shortfalls:**

For RIVET JOINT, the aircraft, sensors, maintenance, pilots, navigators and tactical coordinators are ACC assets whereas oversight and resourcing of back-end intelligence crew and squadrons is provided by Air Force Intelligence Surveillance and Reconnaissance Agency (AFISRA), which reports to the AF/A2.[36] However, all personnel are OPCON to the 55th Wing (ACC). At the Wing-level and below, all aircrew complete joint training together and share the same weapon system documentation. This was not always the case as the front and back-end units previously reported to separate wings, trained differently, and had unique documentation. Since they were integrated operationally under the 55th Wing in 2001, long-time RIVET JOINT operators report improved mission execution along with a greater sense of camaraderie and collaboration between front and back-end elements.[37] The research does not support combining DCGS and RPA units into the same wing as such a move could diminish the flexibility of the limited number of DCGS personnel who support myriad RPA and other airborne ISR aircraft.

However, the RIVET JOINT example highlights the benefits of integrating RPA and DCGS crews even if their units are owned by separate MAJCOMs.

While RPA and DCGS squadrons come from separate MAJCOMs, it is still possible for them to operate as a virtual crew. Since planning and programming for the weapon systems falls under separate chains of command, this partition increases the likelihood that they will be treated separately by the MAJCOM's that own them and with varying levels of support. Moreover, it makes it difficult to fund capabilities that would integrate them as disagreement over how much money each program would be responsible for providing would likely ensue. For example, the Air Staff would likely champion linking the programs in a more robust manner with funding for solutions such as joint crew communications to link the front and back-ends coming from both programs. Different MAJCOM programmers could plead poverty and then underfund requirements. This would likely result in a series of marginal improvements or, because of inconsistent funding, drive programs to make occasional unsynchronized advances. In the face of competing mission priorities, MAJCOMs may not fund improvements. A failure to systematically support programs and operations normally results in long-term decay of existing capabilities and often expensive investment in new programs.

These challenges are not intractable but separate chains of command complicate crew integrations efforts. The Air Force has placed considerable emphasis on properly organizing its ISR forces.[38] However, as a senior intelligence officer points out, "*we have a Unity of Command challenge. AFISRA, which owns the back-ends, reports directly to HAF/A2. ACC/A3 which owns the front-ends reports to the ACC commander. The first commander to own both pieces and provide unified direction is the Chief of Staff of the Air Force*."[39]

**Weapon System Ownership - Progress:**

At the highest level, the Air Force has made progress. In 2006, Air Force Chief of Staff General Moseley elevated ISR to the three-star Deputy Chief of Staff level.[40] Eventually, both front and back-end elements were collocated in the HAF/A2 and programs fell under the Space and C4ISR panel which has served to improve integration. However, much of the operational efforts along with the support of platforms, sensors and personnel belong at the MAJCOM level where several headquarters own pieces of the distributed ISR system.

**Operational Documentation - Shortfalls:**

A further consequence of this ownership conundrum is a lack of overarching documentation. Currently, no CONOPs document exists that describes how the front and back-end elements should operate together. The "the use of imprecise non-standard terms" during the Uruzgan incident demonstrated the potential for mission failure when there are no integrating publications.[41]

As mentioned in the previous section, though RIVET JOINT crew members come from two MAJCOMs, they have a single series of Training, Standardization/Evaluation (StanEval) and Operations manuals. This ensures crew members understand their roles and approach operations as a unified team. Since MQ-1, MQ-9, RQ-4 and DCGS are viewed as distinct weapon systems, they only have Major Design Series unique Training, StanEval and Operations manuals. No multi-weapon system documents exist to provide guidance on how to conduct virtual front-end/back-end operations. Similarly, there are no overarching Air Force Manual 3-1, Air Force Tactics, Techniques and Procedures instructions providing a systematic process to improve crew actions and guide RPA and DCGS operators.

As the Uruzgan incident underscored, it is unrealistic to assume virtual crews will perform like HPTs if overarching guidance does not exist to delineate crew responsibilities, define procedures or provide a comprehensive process for improving tactics, techniques and procedures. While each weapon system does consider the others in its documentation, only limited attention is given to the respective front or back-end elements. The myopic nature of current weapon system documentation perpetuates a non-integrated approach to front-end/back-end distributed ISR operations.

**Integrated Crew Training - Shortfalls:**

A final structural limitation to an integrated crew concept is the training system that prepares RPA and DCGS Airmen for ISR operations. In a RIVET JOINT aircraft, front and back-end crew members now train together though they are owned by separate MAJCOMs.[42] Clearly, integrated training is facilitated by collocation.

Because the current distributed ISR paradigm is based on a bifurcated weapon system approach, no mutual training exists. Though each weapon system does recognize the others in their mission qualification syllabi, they do not conduct combined training. Each weapon system has its own Formal Training Unit located at different bases and owned by different MAJCOMs. There are no shared academic blocks of instruction that could be conducted for both RPA and DCGS Airmen via Video Teleconference or other virtual means. Additionally, the front and back-end elements do not practice operational tasks together in training. Sizeable hurdles must be overcome to link the various training programs but HPTs can't be expected to form if the first time team members are interacting is during live combat missions.

## Recommendations

Operations could be conducted much more effectively if front and back-end distributed ISR elements function as an integrated crew and especially as a HPT. This is based on a detailed understanding of how teams organize and operate and the vast array of literature documenting the positive results when organizations perform like teams. While it is difficult to quantify ISR success or what constitutes more useful ISR, it arguably lies with better support for those using ISR products. Integrating distributed ISR elements would synchronize efforts, improve collaboration and yield more focused ISR for supported elements.

**Developing a Program for Action:**

HAF should develop and issue a Program Action Directive (PAD) requiring full operational integration between RPA and DCGS units. This PAD should be developed in close consultation with the tactical units since they know what guidance they need to form and train integrated crews, grow effective leadership, and provide products that produce mission success. Since elements of this ISR enterprise are owned by multiple MAJCOMs, an AF-level PAD is the best mechanism to ensure AF-wide steps are taken to operationally link multiple weapon systems. Moreover, a PAD provides a strategic, holistic way to integrate distributed ISR nodes and move the Air Force beyond the piecemeal, "penny packet" approach it has taken. While this PAD may contain many elements, it should include at least six initiatives.

**Distributed ISR Crew Study**: To optimize the enterprise, the AF should undertake a thorough study of the current architecture's strengths and weaknesses. It should also explore future technology trends that would enhance virtual crew operations. This study would catalogue the disparate advances that have been made and propose a well-thought out approach for future operations, identify duplicative functions and recommend efficiencies.

**Liaison Officers (LNOs):** The PAD should direct the deployment of LNOs between RPA and DCGS units and direct HAF to fund these exchanges for at least two years or until a permanent and sustainable cross-flow program is in place and functioning. Such exchanges of subject matter experts facilitate operational understanding between the front and back-end units.[43] LNOs enable a range of improvements from training and mission planning to facilitating information flow during missions. During Operation MOSHTARAK in February, 2010, an MQ-1/9 LNO was assigned to the DCGS unit at Beale AFB. The DCGS commander reports this exchange was invaluable since the LNO was able to translate DCGS requests to the RPA unit ensuring immediate action and facilitating a team effort.[44]

**Improved Virtual Crew Communication Tools:** In its study of distributed ISR, the AF must evaluate how to use new communication and classified social media tools to create HPTs and integrated virtual operations. Tools such as A-Space, a Facebook-like program, already exist. This platform could display information such as pictures, crew positions, combat experience and other user generated content and be extended to enhance relationship building, collaboration, and crew member trust.[45]

**Inter-Weapon System Documentation:** The Air Staff should appoint a lead MAJCOM to develop overarching MDS documentation and TTP manuals and provide the appropriate subject matter experts to carry this out. In the interim, the simplest course of action is to add addendums to already existing MDS documents that more clearly delineate the roles and functions of virtual crew members as well as joint TTPs that should be executed. Such a step would provide tremendous fidelity to the myopic perspective current documents offer.

**Integrated Training:** The PAD should prescribe development of integrated training syllabi. While mission qualification training is currently conducted separately, the PAD should appoint a lead MAJCOM to identify training requirements. Integrated training will facilitate confidence building and increase crew cooperation. It also enhances overall operational capability.

**Procurement Guidance:** The PAD should also direct an integrated approach for future weapon system spirals and new acquisition programs. Post acquisition integration efforts are expensive and operationally inefficient. Program Manager and Program Element Monitors must be geared to procure and support integrated weapon systems.

**Unity of Command:**

Resolving the distributed ISR Unity of Command challenge is hindered significantly by multi-MAJCOM ownership of ISR. USSOCOM was created by Congress to provide Unity of Command for multi-service SOF following Operation EAGLE CLAW. The Air Force must do the same for its ISR forces. As the Director of the Air Staff RPA Task Force explained "*ISR is the only core function whose effects lie in multiple MAJCOMs*."[46] While a PAD could provide the overarching framework to solve current front and back-end distributed ISR challenges, sustained progress will be difficult while such elements lie in multiple MAJCOMs.

## Conclusion

Over the past 15 years, the Air Force has fielded an incredible distributed ISR network; demands for this capability continue to rise. This system has yielded numerous operational successes that underscore the professionalism of the ISR operators who operate these platforms, sensors, communications links, and exploitation equipment. However, the operational effectiveness of RPA and DCGS elements is limited because they operate more as independent nodes than as an integrated team. Though a network was established to link these nodes, a framework to optimize their employment was not. This great limitation requires a PAD and organization changes to remedy the current bifurcated front and back-end system.

By taking these actions, the Air Force can achieve the implied synergy of its distributed ISR system that was depicted in figure 1.  Its distributed ISR operations will become even more effective than the impressive missions it executes today.

## End Notes

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